

Guards and Protective Enclosures¹:



TUV Rheinland
of North America

From the Series:

TUV informs you about the hazards of Unlisted / Unlabeled Equipment

During 1997, more than 3,500 people suffered from occupational injuries that were treated in hospital emergency departments¹. Most such injuries were caused by unlisted² equipment that did not meet the minimum requirements for safety and did not contain adequate guarding to protect against such injuries. In this document, we will address the issue of mechanical guarding and its importance in maintaining safe working environments.

Definition:

“Machine guarding is a primary method for preventing mechanical injuries, i.e. those caused by contact or impact between a worker and objects in the work environment.” It is a physical barrier placed on a machine or power transmission system to prevent access to or contact with moving parts.”

Types of Guards:

1. **Adjustable enclosure Guards:** are stationary guards that prevent workers from reaching over, under, around, or through into a hazardous area. A portion of the guard is adjustable, to allow different sizes and shapes of stock material to be fed through the opening. The adjustable guard should not be easily removed or adjusted. Access for maintenance purposes should be remote.
2. **Fixed Enclosure Guards:** are used for situations that do not change over time, e.g. power transmission systems. They should not be easily removed and should provide remote access for maintenance.
3. **Interlocking guards:** provide temporary access to the point of

operation or danger zone. Interlock device prevents operation of the machine when guard is in the “open” position. It will shut down the power and stop any mechanical motions, when the operator seeks entry to the danger zone. In some cases, the guard may be removed only when the conditions are safe. In other cases, the guarding device can be opened during machine cycle provided it is possible to disengage power (e.g. partial revolution clutch) and rapidly brake residual motion.

4. **Presence Sensing Device:** determines when any part of the body enters a potentially dangerous area. Power is disengaged and the machine is placed in a safe state. This device can be a light curtain, a floor matt, an infrared sensor or a capacitance sensor. Even though the presence of sensing device does not provide physical barrier, it has the advantage of enabling normal operation of the machine, which enhances efficiency and productivity.
5. **Automatic Guards:** move the operator’s hands and other body parts away from the danger zone when the machine cycles. An example of such application is a hand-fed power press. OSHA allows pull back devices as automatic guards. Sweep-away guards are not allowed. Such guards must be worn and adjusted to different users and machine setups in order to be effective.
6. **Automatic Stroke Limiting guards:** reduce the maximum opening of the danger zone so much that (1/4 inch or less) that it is difficult to place body parts in a location where serious body injury may occur. This is usually limited to machines that have flat and thin stocks such as press brakes and certain power press operations.

7. **Machine Operating Controls:** such as “two-handed” safety buttons are advantageous, as they do not interfere with motions required to feed parts thus improving the efficiency of the operations. However, they do not provide absolute barrier and may contribute to certain types of repetitive trauma disorders.

Evaluating the suitability of machine guarding requires understanding the operation of the system, efficiency requirements for the operators and safety measures that need to be in place to prevent injury. It is important that qualified designers or NRTL-inspectors evaluate the suitability of protective guards for compliance to relevant safety standards. **TUV Rheinland’s design evaluation and field inspectors are available to provide expert evaluation of the guarding requirements for various types of machines.** Please feel free to contact TUV at your convenience.

Our goal is to make our world a safer place.

TUV Rheinland of North America, Inc.
12 Commerce Road
Newtown, CT 06470
TEL: 203-426-0888
FAX: 203-426-4009
Email: info@tuv.com or
call 1-TUV-RHEINLAND

For more information refer to:
www.us.tuv.com

¹ NIOSH Worker Health Chart book, 2000

² Unlisted: Not certified by a Nationally Recognized testing Lab (NRTL) as compliant to an ANSI approved safety standard.